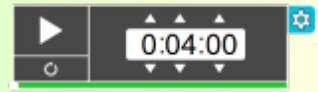
Waves	**Progressive waves and their properties**

Learning objectives	**MUST (C)**	Recall the nature of progressive waves and their classification
	SHOULD (B)	Be able to describe waves in terms of wavelength and amplitude
	COULD (A/A*)	Understand and apply the wave equation

STARTER: What do you remember from GCSE about waves? Quickly jot down any facts, equations or wave characteristics.

EXTENSION: How many things can you observe in the room that you're in that are waves or can be explained in terms of wave phenomena?



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Waves	**Progressive waves and their properties**
MUST (C)	Recall the nature of progressive waves and their classifications

What do progressive waves transfer, and how? How are the two main types classified, and how do they differ?

Progressive waves transfer energy. Do they transfer matter?

The particles oscillate around their equilibrium positions, and so matter is not transferred to a different location.

What about the matter makes them oscillate? Try to think of the surface of a water wave.

The particles exert forces upon one another. When a particle is displaced from its equilibrium position, the other particles exert a **restoring force** upon it.

Definitions of two main types of wave?

Transverse: particles move perpendicular to direction of energy transfer

Longitudinal: particles move parallel to direction of energy transfer

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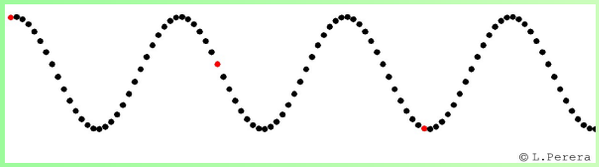
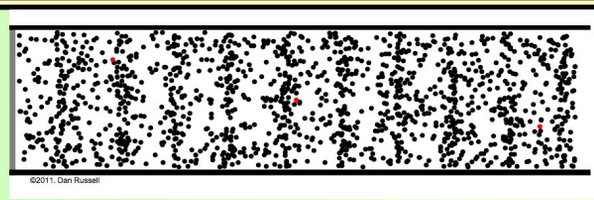
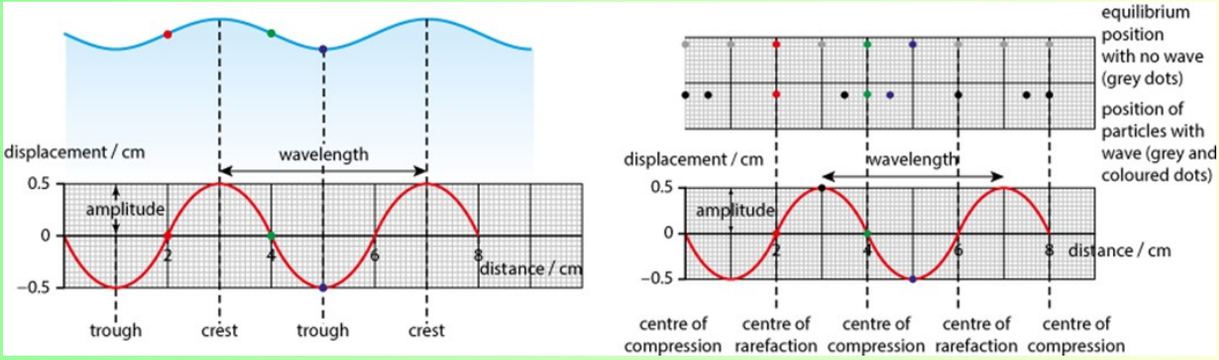






How many of the following can you define with precision?

displacement, amplitude, wavelength, period of oscillation, frequency, wave speed

Include the units where you can.

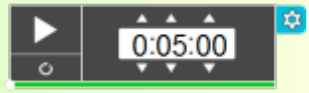
Now download the Waves lesson 1 printoff for the definitions and diagrams: you must learn the definitions.

Waves	**Progressive waves and their properties**
COULD (A/A*)	Understand and apply the wave equation

Two important equations for analysing waves:

$$f = \frac{1}{T}$$

$$v = f\lambda$$



Use the questions on the Lesson 1 printoff.
Recall that c = 3.00 x 10^8 m/s.

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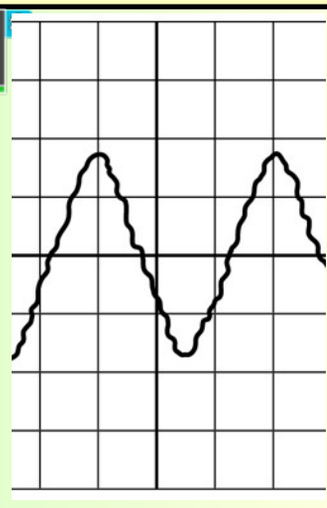
PLENARY

0:04:00

1. An electromagnetic wave is picked up by a detector, which produces an electrical signal. This signal is amplified and displayed on an oscilloscope screen. Each square represents 1 cm.



1. The scale on the *y*-axis is 2.0 V cm^{-1}. Estimate the amplitude of the electrical signal. (*1 mark*) — 3.6V
2. The time base is set to 25 ns cm^{-1}. Estimate the frequency of the signal and hence the wavelength of the electromagnetic wave. (*5 marks*) — 13 MHz, 22.6 m
3. What type of electromagnetic wave is being detected? (*1 mark*) — radio

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